

Deceptive appearance of a normal variant of scaphoid bone in a teenage patient: a diagnostic challenge

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Abstract

Scaphoid fractures are a common injury in late teens and mid twenties with a peak period in skeletally immature children at about 15 years of age, although considered to be rare in first decade of life, its exact incidence in early teen age remains to be a subject of debate. We report an unusual case of anatomical variation of scaphoid bone at the level of waist which could potentially cause diagnostic confusion. A 14-years-old boy presented in the fracture clinic 2 weeks after injury to his Right wrist which was managed in a scaphoid cast. X-ray examinations, both at the time of injury and later on in the fracture clinic revealed features suspicious of a fracture at the level of waist of the scaphoid bone, however the clinical examination did not correlate with imaging, in view of that radiological imaging of the unaffected side was performed for comparison, which revealed it to be an anatomical variant of scaphoid at this age. To our knowledge there are very few cases of such variation reported in literature in this age group of patients. This case highlights the importance of anatomical variants in scaphoid bone in this age group, which might pose a diagnostic challenge and the need for appropriate management plan and reassurance to avoid unnecessary anxiety.

Introduction

The acute scaphoid bone injury is known to cause diagnostic challenges even at expert centres, which in part is attributable to its unique anatomy and vascular supply. The peak incidence of scaphoid fractures in children and adult is between late teens and mid twenties, scaphoid fractures are extremely rare during the first decade of life. The peak period for scaphoid fractures in skeletally immature children is about 15 years of age which parallels the evolving ossification of scaphoid. The mechanisms and anatomy of scaphoid fractures varies between adults and children.

Waist fractures are more common in adults

than in children. However scaphoid waist fractures are increasing in frequency due to involvement in heavy contact athletics at an early age. The diagnosis is important as some of the imaging features can overlap with anatomical variants of this bone. We are unaware of any reported cases in the available literature of such pattern of anatomical variation, which is present at the level of waist to mimic a fracture (Figures 1 and 2).

Case Report

A 14-years-old boy presented in our fracture clinic with two weeks old injury to his right wrist, sustained due to fall in the school. The mechanism of injury was forced hyper flexion of the wrist, this was an isolated injury and the past medical history was unremarkable, he was initially managed in the casualty department and due to radiological features suspicious of a scaphoid waist fracture (Figure 1), he was managed in a scaphoid cast, with follow up appointment in fracture clinic in two weeks time with a plan for further radiological imaging to look for a possible fracture.

His imaging in fracture clinic (Figure 2) revealed the same features as at the time of injury, however there was no evidence of bone resorption at the suspected site. The clinical examination after removal of cast did not correlate with the X-ray findings.

The case was discussed with our radiology team and due to the unique nature of this case an agreed plan of management was established. In ordinary circumstances we would have adopted the route for an MRI scan as per protocol to look further into a possible fracture. However considering the possibility of anatomical variation the simplest route was to follow the good old standard that nature has created bilateral symmetry to assist orthopaedic surgeons! Scaphoid views of the unaffected side were arranged for comparison. The patient was adequately consented and the reasons for doing X-rays on the other side were fully explained. Imaging of the unaffected side revealed similar anatomical variation at the waist level of scaphoid (Figure 3). The patient was reassured and discharged from clinic with a view for a possible follow up appointment in 1 year time.

Considering the age of our patient, it is understandable to look into the aspects of development and ossification of Scaphoid. Ossification of the scaphoid begins between age 5 to 6 years and is complete between 13 to 15 years of age.

Before ossification is complete, the scaphoid is almost entirely cartilaginous.

Throughout this ossification period, fractures of the scaphoid are less common. This infrequency can possibly be explained by a

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thick peripheral cartilage that envelops the ossific nucleus.¹ The cartilaginous covering of the scaphoid bone provides a cushioning effect, therefore a greater force is required to fracture an ossifying scaphoid compared with a skeletally mature scaphoid. In addition to skeletal maturation, the changing patterns of physical activity from childhood to adolescence may explain the relative rarity of scaphoid fractures in children. In skeletally immature patients, scaphoid fractures account for less than 1% of all fractures.² Stanciu and Dumont *et al.*,³ note that scaphoid fractures in skeletally immature patients can easily be missed, especially when the fracture is associated with a more evident distal forearm injury. Because the number of misdiagnosed scaphoid fractures is indeterminable, the exact incidence of scaphoid fractures in skeletally immature patients can only be speculative.³ Although the majority of literature reports fractures of the scaphoid in older children (*i.e.*, age 15 years), studies have demonstrated scaphoid fractures in patients younger than age 9 years.⁴ The exact incidence of anatomical variations in scaphoid bone in teenagers is also unknown, historically bilateral congenital bipartite scaphoid was first described in literature by T. Gerre published in orthopaedic clinics of university of Lund in 1951 and was postulated to arise from incomplete fusion of two separate cartilaginous ossification centres, resulting in a radio-distal and proximo-ulnar fragment.

We are unaware of any such case report about the bilaterally symmetrical anatomical variation at the waist level of scaphoid bone in a teenager which deceptively mimics with a fracture on radiographic images. We began the literature search in EMBASE and medline which only revealed few such publications, one study showing a series of 5 case reports of congenital bipartite scaphoid by Louis D.S. *et al.*⁵ from university of Michigan, New York, but the emphasis of the study was on adults and middle



Figure 1. Right scaphoid views at the time of injury, showing anatomical variation through waist deceptive of a fracture.

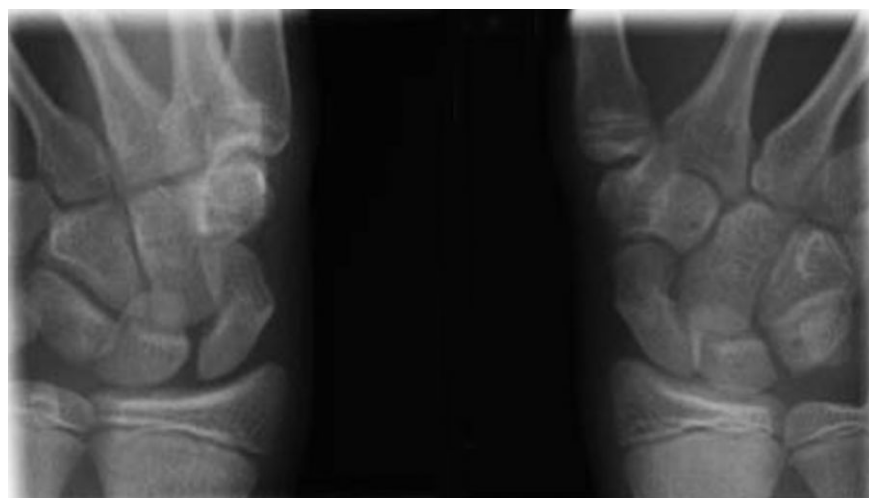


Figure 2. Right scaphoid views, 2 weeks after the injury showing same features.



Figure 3. X-rays showing similar anatomical variation through left scaphoid.

age patients. One study was found on the congenital origin of bipartite scaphoid and the need for further followup by Dubrana F. *et al.*³ However looking through the images our case is not a true representation of bipartite scaphoid and the fusion has already occurred in our case.

Considering the age of our patient who is approaching skeletal maturity, further change in appearance of scaphoid is unlikely however keeping this possibility in mind a further follow up in our case is desirable.⁶⁻⁸

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